Dry Grind Ethanol Process Overview

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Ethanol Produced from a Bushel of Corn

One bushel of Corn (25 kg or 56 lb) ➔ 2.7 gal (10.2 L) of Ethanol

15 lb (6.8 kg) of DDGS ➔ Ruminant Food
Ethanol Production Process Steps

- Grain Receiving & Cleaning
- Grinding & Mixing
- Cooking & Liquefaction
- Saccharification & Fermentation
- Distillation & Dehydration
- Coproduct Recovery
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Corn Receiving

1. Corn Receiving
2. Milling
3. Ethanol Storage
4. Water
5. Jet Cooker
6. Thin Stillage
7. Recycle
8. 200° Proof Ethanol
9. Mole Sieves
10. 190° Proof Ethanol
11. Steam
12. Alpha Amylase
13. Glucoamylase & Yeast
14. Mash
15. Heat Exchanger
16. Liquefaction
17. Sugarification & Fermentation
18. Steam
19. Whole Stillage
20. Distillation System
21. Beer
22. Syrup
23. Thin Stillage
24. Centrifuge
25. Wet Grains
26. Dryer Recycle
27. Dryer
28. Cooling
29. DDGS
30. Corn Receiving
31. Evaporator

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Corn Receiving

Corn Quality Testing

- Corn delivered at plant is measured for
  - Moisture content
  - Fungus Contamination
  - BCFM (broken corn and foreign material)
  - Test Weight
  - Grade
Corn Receiving & Storage

Corn Storage and Milling
Corn Milling: Hammer Mills

Corn Slurry Preparation and Cooking
Cooking: Jet Cooker

Liquefaction
Liquefaction Tanks

Saccharification and Fermentation

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Yeast Propagation Tank

Different Phases of Yeast Growth Cycle

- LAG
- LOG
- STATIONARY
- DEATH

Growth

Time
Saccharification and Fermentation

Beer Well
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Distillation

Corn → Milling → Liquefaction → Heat Exchanger → Flash

190° Proof Ethanol

100° Proof Ethanol

200° Proof Ethanol

Jet Cooker

Milling Glucoamylase

Thin Stillage Recycle

Mole Sieves

190° Proof Ethanol

Ethanol Storage

Mash

Steam

Syrup

Centrifuge

Thin Stillage

Wet Grains

Whole Stillage

Distillation System

Dryer Recycle

Dryer

Cooling

DDGS

Syrup

Evaporator

Syrup

Syrup

Cooling

Distillation System

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Mole Sieves
Whole Stillage Centrifuge

Separation Technology General: Decanters
Wet Distiller Grains (Wet Cake)

![Image of wet distiller grains](image1)

![Image of wet distiller grains](image2)

Wet Distiller Grains (Wet Cake)

![Image of wet distiller grains](image3)
Thin Stillage Evaporation and DDGS Drying

Thin Stillage Evaporation
Thin Stillage Evaporation

Ethanol Loadout
Feed Dryer

DDGS Storage and Loadout
DDGS Storage and Loadout

DDGS Loadout
CO₂ Recovery

CO₂ Facility
CO₂ Storage

Regenerative Thermal Oxidizer